

Establishment of an Information Culture: Achievements and Challenges in Zambia

Alex Simwanza

Health Management Information Systems Advisor
Zambia Integrated Health Program

Mary Church

HMIS Consultant

Background

Zambia is a landlocked country of 10 million in south central Africa, with a per capita gross national product (GNP) of approximately US\$370.¹ It faces severe health problems: one of the highest HIV/AIDS prevalence rates in the world, with an estimated 20 percent of adults between the ages of 15 and 49 infected;² increasingly drug-resistant malaria; and severe budgetary constraints, with approximately US\$10.50 per capita available to the health sector.³ Life expectancy has fallen from 54 years in 1990 to an estimated 37 in 2000.⁴ Zambia also faces severe shortages of qualified health workers, many of whom find better working conditions and salaries in countries to the south (Botswana and South Africa). Public health administration is divided into the Ministry of Health (MoH), which determines health policy, and the Central Board of Health (CBoH), which implements policy (and houses the information system).

In the early 1990s, the MoH began reviewing health reform options. By the mid-‘90s, the Minister of Health had made implementation of the health management information system (HMIS) a priority, as part of an ambitious health reform project. An information system was included as part of the national strategic plan to improve management of service delivery at all levels, from Health Center workers to national managers. Accordingly, design and implementation commenced in the fall of 1996. Testing and training proceeded through 1997 and 1998. By January 1999, the HMIS was used nationwide in all Health Centers, all District Health Offices, and in the national CBoH office. Currently it is also used in all nine Provincial Offices, and at hospitals in two of nine Provinces.

Approach

The challenge is to develop a culture of constant use of data. While the HMIS was designed, and health workers trained in accord with internationally documented practices, a technically sound system, in and of itself, does not mean that data are incorporated routinely into the decision-making process. What people often call the HMIS is really just an information pipeline. But, in fact, the system, in the broader sense, is the interaction of information consumers with the pipeline. In Zambia, the pipeline has been built, and the emphasis needs to be on the people using the information. Therefore, the current objective is to strengthen managers’ skills and improve data through strong feedback loops.

The evolution of health reform policy has strongly influenced the HMIS. In brief, the MoH has rethought its reform strategy several times since late 1997. Since then, the national CBoH has restructured twice, and the intermediate administration—the province—has been redefined and relocated. During the several administrative restructures, the HMIS’s institutional home has also changed. In other words, while districts and facilities have remained fairly stable, the upper support lines, at the provincial and national levels, have changed several times. Therefore, there is a need to strengthen the information skills of new national and provincial officers, while identifying and disseminating best practices in district and facility information use.

Staffing patterns throughout the CBoH are quite lean, including the HMIS unit. No one is responsible for supervising/stimulating management use of the information. Two documentation specialists have several

responsibilities, including dissemination of HMIS information, and an information technology specialist's numerous responsibilities include support of the HMIS. This staffing pattern is not adequate for the tasks, so several partners provide assistance in the form of local consultants (two trainers and two data entry clerks) and long-term advisors with HMIS responsibilities in their portfolios.⁵

In general, staffing at provincial, district, and facility levels has gone down by about 10–15 percent in recent years due to voluntary separation, transfers or altered responsibilities, and deaths. It has not been possible yet to incorporate HMIS training into preservice curricula or to establish inservice HMIS training. High staff turnover, combined with the absence of ongoing training mechanisms, means that new staff may not have the basic skills needed to use the HMIS.

Field experience

While this description of the field experience focuses on the challenges, there are also a number of accomplishments to be reported. A small number of indicators (74) have been agreed on for routine monitoring; these indicators reflect health status and service delivery, as well as drugs and supplies, finances, etc. Standard case definitions were introduced for the first time nationwide. The information flow has been rationalized into a single channel from multiple channels, and the data collection instrumentation reduced from some 36 forms to just two. Each facility, district, and province, as well as the national office, is directed to assess its information and performance quarterly, using standard guidelines, although the quality of data and assessments varies considerably from place to place. Data are transferred fairly quickly and are available at each level much more quickly, and with many fewer human resources, than in the past. However, the goal of having prompt quarterly dissemination of information and feedback to reporting units has not yet been accomplished, except in two provinces and some districts.

The Western and Southern Provinces were drawn into the implementation cycle early. The Western Province, in particular, has been a focus for the Netherlands for several decades, and some of the decentralization processes were tested there before national implementation. It was hoped that these areas would adopt the practice of using information for management readily. And, indeed, these provinces and districts provide some of the best examples of how local expertise can develop. Even these areas report that improvement at the facility level is very slow, and it has not been possible to devise a mechanism to transfer the skills developed in these provinces to other areas of the country.

National constraints

As already mentioned, at the national level, the CBoH has restructured itself several times in the past five years, most recently in summer 2000, and the HMIS's institutional home has changed accordingly. There has been an ongoing need to train new staff and to reinvent dissemination and feedback protocols. The challenge for CBoH is how to make data available to interested parties in a timely manner and to ensure that data are not misinterpreted.

The HMIS data have been presented at the following forums: cooperating partners meeting in April 2000, quarterly basket fund steering committee meetings, and in an annual health bulletin. The fact that some performance data have been presented during the meetings was underscored as a positive step in ensuring that CBoH/MoH uses HMIS data as a management tool. While an attempt was made to include HMIS data in the five-year plan during a joint assessment exercise in early 2000, the HMIS data have not been included in the national annual planning exercises. (Facilities, districts, and provinces, however, have begun to use HMIS data and peer review in their annual planning.)

There is no national HMIS advisory board; this has led to several problems. There has been no continuity in advocating routine use of data in decision making and planning. Coordinating HMIS support by donors, and responding to their information needs, has not always been a transparent process. For

example, in recent months, a review of disease surveillance has been scheduled, and the Roll Back Malaria program has instituted a separate reporting system in selected districts. It is not entirely clear whether these efforts will be integrated into the HMIS protocols or whether they will retain their focus on a specific technical area. Danida and USAID continue to provide technical support for specific HMIS issues; while there is informal coordination, there is no mechanism to draw all interested parties into the process.

Provincial constraints

Like the CBoH at the national level, provinces have restructured and relocated as well. Attracting qualified staff, then training them in information use and supervision and performance review, are the current challenges. Only five of nine provinces have filled the position of Data Management Specialist, the officer who is responsible for HMIS operations at the province. The provinces use information to plan their own activities and to supervise/review their districts' performance. Although provincial review of districts is viewed as a major mechanism for improving district use of information, it is not clear how provinces' information skills will be reviewed and improved. While two provinces have begun producing quarterly health bulletins, staff and resource limitations in other provinces permit little supervision or feedback to districts.

District constraints

While district administrative procedures have changed little since the introduction of the HMIS, district staff turnover has been fairly high, and there is a constant need for on-the-job training in the HMIS. For several years, provincial support of district information use was weak to nonexistent. During that same period, district funds were only 30–50 percent of the allocated budget, so most District Health Management Teams (DHMTs) operated in crisis management mode, unable to complete planned activities. In short, just as the HMIS was introduced nationwide, funding for planned activities and supervisory support to use the system disappeared.

Most observers agree that if the District Health Officer (DHO) is interested in using information to support management decisions, and the District Health Information Officer (DHIO) has interest in providing reliable data, use of the HMIS as a decision support tool, and the quality of the data, will improve. However, this is probably not the situation in most districts, where data quality is unreliable and information is used infrequently and poorly. Clearly, the next steps are to identify best practices in district use of information and encourage their adoption in weaker districts. This is easier said than done, especially when provincial and national support is only beginning to emerge.

Facility constraints

As observed at the district level, if the facility in charge is interested in using information, use of the HMIS and the quality of its data, improve. And, as at districts, this is the exception. Particularly at rural Health Centers, staff members often are not equipped to use numbers, either by education or experience. Classroom exercises during HMIS training have not implanted these skills. For example, aggregation of results can produce a different result each time it is done. The concept of percentages, which is basic in assessing service delivery, is all too often simply not understood. Rural Health Center staff may also have weak diagnostic skills and little understanding of principles of rational pharmaceutical use.

These constraints are intended to be addressed by supportive supervision from the district to the facility; the supervision is directed to both data verification and analysis. But given the magnitude of the problem, resource limitations for supervision, and the sometimes limited skills of the district supervisors themselves, the process of improving use of information and data quality at the facility is very slow.

Supervision, review, and local use of information

By local use of information we mean the comparison of information on performance to standards and expectations—for example, coverage rates to standards, and disease cases to the number expected—followed by an action-oriented problem-solving cycle if the difference indicates a problem. As is common practice, this analytic process should occur at least quarterly at all management levels, to ensure the quality of data and, more important, improve performance.⁶ In Zambia, an intensive part of the HMIS training was directed toward this self-assessment process. We saw it as the heart of the system, the way to create an institutional culture that values information.

We also assumed that information use is a self-enhancing process: as the information is used, the quality of the data and the decisions improves. Stimulating and supporting self-assessment was seen as the key tool for institutionalizing information use. Supervision of self-assessment should be conducted at all levels at least quarterly, when special actions may be required to respond to results not anticipated in the annual plan. Written feedback should be a part of supervision. This process is distinct from, although, one hopes, intertwined with, clinical supervision, which focuses on the way care is provided to individuals.

In fact, lack of resources, both human and financial, may not permit this ideal mode of supervision. Several alternatives are being tried in Zambia.

- Quarterly feedback to districts from national and/or provincial levels is seen as essential, even if routine quarterly supervision is in place. Similar feedback from districts to facilities is strongly encouraged.
- Quarterly review of results from each reporting area to identify “trouble spots” as priorities for on-site supervision or at least communication.
- Peer review using data during province-wide and district-wide meetings and planning sessions.
- Skills in data use included as part of performance evaluation.

It is too early to assess the effectiveness of any of these measures.

Lessons learned

We have described the status and current issues in the operation of the Zambia HMIS. It is clear that while much has been accomplished, the HMIS is not yet used as broadly for evidence-based decision making as hoped, nor does it consistently produce evidence of the quality required to support good decisions. While some of the shortcomings might be removed by changing instrumentation, data, and indicators—what we could call “technical fixes”—the root problems are more systemic and require changing the way people interact with information. In looking at these problems, it is useful to bring in the experience of other countries that have initiated nationwide information systems.⁷

Institutional emphasis on information

Creation of an institutional culture that promotes use of information at all levels generally begins as a top-down process. This can be seen in case histories of private and public sector organizations whose successful use of routine information is often cited as an model for information use and health sector reform in general. In Zambia, as in many other countries, the institutional imperative to introduce a new information system came from the top and worked its way down, even though it was intended to promote and stimulate bottom-up decision-making processes.

In Zambia, we failed to solidify initial national support for the HMIS into an ongoing institutional framework that includes both Ministry officials and cooperating partners. Besides the ongoing advocacy that such an advisory group can provide, there is the question of continuing refinement of the information system. Certainly the information system will need adjustment over time to reflect emerging priorities

and, it is hoped, increased sophistication in using the information. There is also the question of demands for information from cooperating partners. In Zambia, the calls for change in the information system seem to come from cooperating partners, not the Ministry. While some of these changes might lead to service delivery improvements, some may simply reflect international demands for information that have little operational relevance. It can be quite difficult for Ministry officials alone to negotiate with a powerful external partner; a national advisory group that includes representatives from several cooperating partners introduces transparency and balance into the sometimes contentious process of refining the information system.⁸

Among the national HMIS efforts with which we are familiar, only Ghana and Zambia did not concentrate on establishing an ongoing national advisory group early in the process. For Ghana, this question is well documented in Bruce Campbell's book on information systems in Ghana and Nepal,⁹ and we have briefly described the issue in Zambia. While the details differ, in both cases national support depended on a few individuals; the situation changed rapidly when these individuals changed assignments. In Ghana the effect was to cancel national deployment; in Zambia, this outcome was averted, but a national advisory group likely would have alleviated ongoing problems of advocacy and revision.

Investments in system implementation.

The organizers of this conference have asked us to express the lessons learned in terms of investments in information systems. If we defer for a moment the question of ongoing support to create an institutional culture that uses and values information, we can draw some conclusions from the Zambia experience.

- **System design.** Once the design is implemented, it becomes very expensive to completely reengineer. It is important to get it right the first time. There is a fairly large and growing body of experience in implementing national information systems. Study of this experience in the design process, as well as soliciting the participation of national and international experts, pays off. Much of this documentation is in the public domain. An archive of these materials, accessible through the Internet, would be a fairly inexpensive but valuable service.
- **National advisory group.** The consequences of not making this investment have been discussed. It is well worth the time and negotiation required.
- **Training and documentation.** In Zambia, we invested heavily in training, both in data collection and information use, and in classroom and on-the-job training. Documentation, both for training and procedures manuals, was also a substantial investment. It is difficult to quantify the impact of these investments, but, at the same time, it is difficult to see how a somewhat revolutionary concept, using information for management, can be introduced without extensive training. Our experience suggests that the on-the-job part of the training should be emphasized as much as possible. Ongoing preservice and inservice training is also essential.
- **Automation.** In Zambia, the HMIS is automated from the district level upwards. Automation, with sensible data verification procedures, allows managers to focus on the information rather than the calculations that produce the information. Automation at the district level is usually technically feasible, and it gives managers direct insight into the quality of data at the collection point. Costs associated with automation include purchase of technology and training.
- **Recurrent costs.** It is estimated that annual recurrent costs for the HMIS in Zambia are US\$89,000. This includes stationery (about one-third of the total), equipment maintenance, training, and travel/office supplies; equipment depreciation and staff time are not included. This sum represents only 0.75 percent of the total health budget in Zambia, or a cost of less than US\$.01 per capita.

Establishing an information culture

Supervision, review, and local use of data are the techniques we all use to establish an institutional culture that uses and values information. In some places, we can see slow improvement; often these are places

where external partners emphasize and support the process. While these improvements reassure us that we are not pursuing a totally impossible dream, most observers also report that, in general, supervision and data use remain important issues for the information system.

To see a way forward, let us turn for a moment to some accomplishments in stimulating the use of information. In Kyrgyzstan¹⁰ and Ukraine, similar systems were introduced for managing immunizations. While both report ongoing problems with supervision and data quality, new management practices were adopted quickly, and the quality of data seems to be good. It has been possible to show that use of the information system has improved service: timely coverage has increased through detection of incorrect application of protocols for contraindications, and vaccine use and centralized procurement procedures have resulted in more cost-effective use of resources. These results were clear quite quickly, within a year or two of nationwide system deployment.

What's their secret? The fact that these systems are limited to vaccine preventable diseases is doubtless a factor. The introduction of MIS systems for HIV/AIDS or TB would have been much more difficult because of the political ramifications within the medical establishment and other areas of government. If we look more closely, however, we discover that many of the same analytic tools used in Kyrgyzstan and Ukraine were introduced in other countries in the last half of the 1980s, as part of the Universal Childhood Immunization (UCI) effort. All too often, these tools were not integrated into routine management practices and were unused, especially after external support for UCI disappeared.

I believe that the main reason why the Kyrgyzstan and Ukraine systems have been so successful is that these countries already had an established information culture. For example, both have fairly accurate vital events registration for births and deaths. In the Ukraine, surveillance for Acute Flaccid Paralysis was incorporated into the existing surveillance system without external assistance; in the first year of operation, the surveillance proved itself sufficiently sensitive to satisfy the World Health Organization's requirements for polio surveillance. Vital events registration and surveillance have been far more problematic in many countries. There is also a long history of the use of information for performance evaluation in Kyrgyzstan and Ukraine, dating back to the practices of the former Soviet Union. To be sure, in the past the information was used for centralized, not decentralized, management. While it is also acknowledged that data were falsified, many who admit to falsification also know the "real" figures. Information has been valued in Kyrgyzstan and Ukraine, and managers were ready to adopt the new practice of evidence-based decision making.

The stories of Kyrgyzstan and Ukraine are both hopeful and cautionary. Hopeful in the sense that they validate our premise: the use of information can improve management practices. Cautionary in the sense that we should remember our earlier UCI efforts and not immediately decide to try to replicate the strategy in settings where information is not valued as highly. This brings us back to the reasons why we introduce an integrated HMIS in poorer countries, like Zambia. While a handful of vertical programs may be able to report fairly accurate and timely information, the information system as a whole is, frankly speaking, in a shambles when we begin. We know the characteristics only too well: too much data, largely unused, inconsistent, inaccurate, and reported too late to be of any use. There do not seem to be any alternatives other than the one we adopt: an integrated system with a small number of indicators that can be used for action-oriented decision making. And this strategy does work to some extent. We are able to produce more timely and useful information, and some health workers are stimulated to use this information to improve management practices. However, we have been unable to find an example where the national integrated systems produce overall measurable improvements in performance, as in Kyrgyzstan and Ukraine.

We have little choice but to find a way that national integrated systems can support the use of information to improve health care. Perhaps the strategy we used in Zambia has some use: early involvement of areas

where we anticipated ready acceptance of the new practices. Or it may be that at the same time we introduce integrated systems, we need to focus on a specific national problem that can be tackled to demonstrate how information can be used to improve service. There does seem to be a threshold effect: once people recognize the value of information, this understanding transfers fairly easily to different technical areas. Or perhaps someone has an innovative solution to the vexing problems of supervision and local data use. It might also be useful to review the experience of countries where the use of information for management has improved over the past 10–20 years.

So the last investment in information systems is to use our collective experience to find an answer to questions that Ministries and partners ask:

- How long will it take for the information to be reliable enough, and health system managers to have enough skills, to support evidence-based decision making?
- How much more will it cost?
- What do we do until then (and how do we monitor the process so we know when “then” is)?

These are perfectly reasonable, indeed important, questions, even if we cannot answer them very well. We hope that one of the results of this conference will be agreement on how to tackle these questions.

¹ Data for 1997, World Bank.

² Estimate for late 1999, UNAIDS.

³ In 1995, the government assessed the burden of disease in Zambia based on Disability Adjusted Live Years (DALYS), followed by defining a cost-effective package of interventions. While the basic health care package, which guarantees access to health services for the poor, has been identified and estimated to be US\$11.50 per capita, the health sector has only US\$10.50 per capita available.

⁴ *Poverty Reduction Paper-Health Chapter*, Zambia Ministry of Health, Planning Division, 2001.

⁵ Both Danida and USAID have provided continuous support for the HMIS since the mid-‘90s. Currently, Danida focuses on national and provincial support, including automation. The Zambia Integrated Health Project (ZIHP), a USAID-funded effort to support initiatives in demonstration districts, provides technical support to the HMIS by using district field visits to inform the national level, by working with provincial teams, and by developing district strengths in the demonstration districts. The Government of the Netherlands supports physicians acting as advisors to selected districts and provinces; these “Dutch doctors” also have provided considerable technical assistance (and valuable unrestrained criticism) in HMIS implementation and ongoing use.

⁶ Quarterly frequency is a compromise between monthly (probably unrealistic) and annual (not frequent enough for micro-planning). People argue about the ideal frequency, but that’s another discussion.

⁷ The comparison is limited to national systems because the root problems revolve around national infrastructure and capacity issues. While there is much to be learned from systems implemented in the context of specific projects, questions remain regarding how successfully these systems can be brought to national scale, and what happens when overall project support is withdrawn. This is a separate issue.

⁸ Several interesting innovations have been made in building national consensus. In Nepal, collaborating partners were asked to provide services or funds as a way of deepening their involvement. In Malawi, district officers have been encouraged to use the information available to them even before introduction of the new HMIS. This will probably increase understanding as well that can be used in developing the HMIS itself.

⁹ Campbell B. *Health Management Information Systems in Lower Income Countries*. KIT Press, 1997.

¹⁰ Weeks M Firsova et al. Improving the monitoring of immunization services in Kyrgyzstan. *Health Policy and Planning* 15 (3).